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PATENT COOPERATION TREATY



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P037640/WO/1	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DE2003/000661	International filing date (day/month/year) 03 March 2003 (03.03.2003)	Priority date (day/month/year) 07 March 2002 (07.03.2002)
International Patent Classification (IPC) or national classification and IPC B22D 13/04, C22C 14/00, B22D 13/06		
Applicant MTU AERO ENGINES GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>7</u> sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of <u>10</u> sheets.
3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 02 October 2003 (02.10.2003)	Date of completion of this report 18 June 2004 (18.06.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE2003/000661

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages 1-7, filed with the letter of 01 June 2004 (01.06.2004)
- ☒ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages 1-14, filed with the letter of 01 June 2004 (01.06.2004)
- ☒ the drawings:
 pages 1/2, 2/2, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE2003/000661

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos. _____

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV.3.

Lack of unity of invention

The application contains several (groups of) inventions, namely:

a) Claims 1-12

method and device for producing dimensionally accurate precision castings of components by means of centrifugal casting;

b) Claims 13 and 14

Nonferrous metal alloys.

For the following reasons, these inventions are not linked so as to form a single general inventive concept (PCT Rule 13.1):

Upon consideration of the application as a whole, including the description and illustrations, the general problem linking independent claims 1 and 6 appears to be that of filling a casting mold completely and free of shrinkage cavities (see page 7, lines 3-5).

This problem is solved in that the geometry of the casting device according to claim 6 (device) is suitably adapted and, in this way, the Coriolis forces of the centrifugal forces acting upon the melt can also have a specific effect and can act upon the melt in a manner similar to a stamp (see page 7, lines 1-3).

The effect of the invention is that the melt fills the casting mold homogeneously and without the formation of cavities.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE 03/00661

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV.3.

The selection of a particular alloy (claim 13) does not contribute to the solution to the problem, and consequently the present application is considered to lack unity of invention.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/DE 03/00661

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	6-12	YES
	Claims	1-5, 13, 14	NO
Inventive step (IS)	Claims	6-12	YES
	Claims	1-5, 13, 14	NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO

2. Citations and explanations

1. Reference is made to the following documents:

D1: US 2001/0045267 A1

D2: EP-A-1052298

2. The problem addressed by the invention is that of significantly improving the production of nonferrous metal alloy components produced by precision casting such that the casting molds are filled completely and are free of cavities (see page 1, lines 22-24 and page 7, lines 13-19).

This problem is solved by a method and a device having the features of independent claims 1 and 6.

3. The device according to the invention is not previously described by any of the search report citations. These documents do not disclose the fact that the casting molds are adjustable within the container. A person skilled in the art would also not have found anything in these documents to suggest proceeding according to the invention.

Therefore, independent claim 6 satisfies the requirements of PCT Article 33(2) and (3).

Claims 7-12 relate to advantageous embodiments of claim 6 and thus also satisfy the requirements of PCT Article 33(2) and (3).

4. A method is known from document D1 for producing dimensionally accurate precision castings of nonferrous metal alloy components using casting molds, corresponding to the external shape of the components to be produced and consisting of heated forms, into which the melt is poured via outlet openings from a heated, rotatably mounted casting device, the spatial angles at which the casting molds are set being **adjusted** with respect to each associated outlet opening (paragraph [0056]: "forms, arranged in several planes") such that the molds are completely filled with the aid of acceleration forces, including the Coriolis forces of the centrifugal forces acting upon the melt (see paragraphs [0025] to [0066] and figures 1 and 2).

Therefore, the subject matter of claim 1 is not novel (PCT Article 33(2)).

5. The features of claims 2-5 are also known from document D1 (see the passages indicated above).

The subject matter of these claims thus also lacks novelty (PCT Article 33(2)).

6. In accordance with page 3, lines 23-30, of the description, claim 13 is interpreted as claiming that the alloy according to this claim can also contain 0 to 2000 ppm oxygen, 0 to 2000 ppm carbon, 100 to 2000 ppm nickel and 0 to 2000 ppm nitrogen.

A nonferrous metal alloy based on a TiAl metal alloy with 31.5 to 32.5 weight-% Al, 4 to 5.5 weight-% Nb, 1.5 to 3.0 weight-% Mn, 0.2 to 0.4 weight-% B and 0.04 to 0.1 weight-% C and a balance of Ti (see paragraph [0008]) is known from document D2.

Therefore, the subject matter of claims 13 and 14 is not novel (PCT Article 33(2)). Reference is made to the fact that the amount of nickel indicated in claim 14 is considered to be a level of impurity that is normally present in alloys such as these.

7. Reference is also made to the following:

Claim 6 does not disclose all of the necessary device features. No means are indicated for casting molds whose angular setting can be adjusted.